Industrial FINISHING

Reg. U. S. Pat. Off.

Devoted to Product Finishing in the Factory

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Letters from Readers of "Industrial Finishing"

The names and addresses of firms or individuals whose letters and inquiries appear in this department may be had by writing this office, or letters addressed to them in care of this office will be forwarded promptly.—The Editor.

Brown Mahogany on Elm

We are using a number of frames with elm carvings on them, which we wish to finish to simulate brown mahogany. We have tried various methods but without a great deal of success and wonder if you could suggest some method which would be inexpensive and yet would give us a good imitation of brown mahogany?—D. Mfg. Co. (Fine Upholstered Furniture).

2-Coat Suede in Color?

We understand there is a 2-coat suede finish, in various colors, being manufactured by one of the paint or varnish companies. Will you kindly give us information as to the name of this manufacturer, so that we may be able to communicate with them?—B. C. Co. (Cigar Boxes).

Spray Guns for Export

We are exporters to the Philippine Islands, and are greatly interested in paint-spraying guns for that market. We shall therefore appreciate your furnishing us, if possible, with a list of manufacturers of these paint-spray guns.—Q. I. Co. of Manila, P. I. (Export-Import).

Stain for Cane Seats

Can you tell me if there is a stain, walnut or mahogany, that is especially adapted for staining cane, such as cane seats in chairs? I would like a stain that gives an even finish. If you can tell me of such a stain I would like to know the name of the stain and complete information about applying it.—S. R. L.

Photo Print Finish

What is the quickest drying material that can be used over photo prints—one which will give a high gloss and dry extra fast? Do you know of any roll equipment that will varnish and dry on 5x7-in. photo prints?—H. Art Studios.

Table Top Finish for Drinking and Smoking

We are endeavoring to locate a finishing material that will be satisfactory on black Masonite or wood, for use on booth table tops, counters, etc., in restaurants and other such places. These tops are given exceptionally hard usage and must be alcohol-proof and heat-resisting—burning cigarettes being one of the hazards in connection with them. Are you familiar with a material that will meet any such test and be satisfactory?—T. V. Co. (Store Furniture).

Squeegee and Roller Processes

We would appreciate any information you can give us on the squeegee, and also the rubber-roller process of staining.—C. T. Mfg. Co. (Toys, Games and Novelties).

That New Wood Filler

In the June issue of INDUSTRIAL FINISHING we notice the article on "A Revolutionary Development in Wood Filler" (page 53), and we

HEAT RESISTANT FINISHES

If heat resistance is a necessary requirement of the finish on your product you will find help in these Hilo Coatings.

ALUMINUM VEHICLE No. 6—stands temperatures up to 900 F. Use with any metallic powder.

SHRIVEL AND CRYSTAL—Black one coat art finishes, stand 400 F.

SYNTOL BAKING—in colors—unaffected up to 250 F.

BLACK BAKING JAPANS—Rubber and gloss, give service at 450 F.

Bulletins describing these products will be mailed on request. If you desire, a trained representative will call to discuss any of your finishing problems.

HILO VARNISH CORPORATION

"70 Years Experience"
42 Stewart Ave., Brooklyn, N. Y.
Branches:
Boston—Chicago—Philadelphia

would appreciate any further information you can give us with reference to the above.—T. R. Co. (Furniture).

Grained Finish on Metal

We are estimating on some metal units, somewhat similar to radiator covers, which call for a burl walnut finish on metal. We would like to have what information you can supply us regarding the process necessary to acquire this finish. Also, we would like to know of anyone who might be interested in applying such a finish on the complete units.—G. G. V. Co. (Sheet Metal Products).

Silk Screen Paints

Can you furnish us the names of some manufacturers of water-color paints for silk-screen process work? —T. D. Co.

Trade-marking in Gold Leaf

Can you advise us of a source of supply for a machine that stamps names, trade-marks, etc., in gold leaf on lacquer or varnish finished articles? The machine we want is similar in make to those used in the pencil business—except that we desire to use it on a considerably larger article.—K. C. & Son (A Variety of Products).

Stick Shellac for Burn-in Repairing

Rather than remove page 14 of the June issue, which would tend to spoil your valuable book, permit us to address you. We would like to know the name of the manufacturer of stick shellac most suitable for burning-in damaged places that are to be sprayed over. Our trouble is, that when the coat is applied (lacquer), the solvent attacks the burned-in place, causing it to swell and raise.—G. & I. Co.

Kaiser Gray on Oak

We are sending you a piece of plain oak, finished one side, and wish to inquire if you know of some one who can inform us of the different materials to be applied to produce this finish, particularly the color. We have used this finish, and produced it with water stain, but are desirous of producing it with an oil stain to prevent the raising of the grain. If you can please hand this to some one who can give us this information without obligation to us, we will appreciate it very much indeed.

Editor's Note: The color is what was formerly known as Kaiser Gray —a medium dark gray with silver or aluminum colored threads running lengthwise of the grain—a transparent gray which reveals the characteristic oak grain with the darker lines (which make the flakes in quarter-sawed oak) showing through clearly. —O. Mfg. Co. (Architectural Woodwork).

Porcelain Enameling Equipment

We would like to get in touch with manufacturers of porcelain enameling plants. This equipment would be used for porcelain enameling of cast-iron and other metals made up in such products as bath tubs, wash stands and similar articles. This information is requested by our Philippine House, and it is likely that the plant would be more for repair work than anything else. Necessarily it would have to be small, but equipped with possibilities of doing greater work. We would appreciate any assistance you will give us in locating manufacturers who will be able to supply the equipment desired.—V. G. B. & Co.

To Bleach Spools White

In May issue of INDUSTRIAL FINISHING (page 49), reference is made to mahogany and walnut being bleached to a bone or ivory whiteness. This is a very interesting proposition to us as we want to make dark-colored spools white at a reasonable cost and without detriment to the spools themselves.

We are forwarding you samples of several spools—some white and some discolored—which, when they are not absolutely white, must be discarded even where the dimensions and everything are O. K. Can you tell us how we can procure this whiteness?—C. Mfg. Co.

Concrete Form Coatings

What is the best product to use in coating wood forms used in making cast stone products—something that will stick to the wood but which will not stick to the moist concrete used in making cast stone?—O. B. Co. (Cement Products).

Salesman Versus Purchasing Agent » »

by Frank Finisher

THE CAPTION of this article does not mean the prize-ring interpretation, although at times a round or two between the two mentioned parties would give vent to their pent-up emotions. I have reference to the position one puts the other in at times—sometimes in very embarrassing positions—because of the lack of sufficient knowledge to fill their respective positions.

The management in some plants, for some reason or other best known or unknown to themselves, does not care to have the finisher purchase his own materials and so elects the purchasing agent to the duty. Is he at all qualified? No questions asked, he assumes his duty. This duty as well as his others call for economy (especially during this shakedown) and he senses an opportunity to get in solid because there is a wide range of materials and prices.

Send Us a Sample

In steps friend salesman who needs business badly and is greeted with a "That's too much," expression on said purchasing agent's face. The salesman presents his wares and his price is a bit lower (after much argument on prices) than for the materials the firm is using. This makes a favorable impression and a "send me a sample" goodbye.

Testing the Sample

The sample arrives and is brought to the finisher. The finisher tests the sample and reports: "It's a good material . . .

The salesman of finishing materials, the purchasing agent, the finishing foreman and the factory manager—each has a job to fill, and usually he is trying to do it to the best of his ability, therefore each individual deserves consideration from the others with whom he comes in contact, but unfortunately where harmony, mutual cooperation and good fellowship should prevail there is sometimes discord—and as a result the companies involved suffer needless but serious losses. Let's look into the why, when, where and how of some of this economic waste, and strive to do all we can individually to improve the situation—perhaps by a little quiet self-analysis and self-improvement. — The Editor.

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slightly less body and coverage, etc." What's this? "Less coverage and body?" Something to corner friend salesman and make an impression.

Salesman returns for report. He informs the purchasing agent it carries the same percentage of solids equal to most of the materials on the market, and therefore coverage and deposited solids should be the same as the materials they are using. The purchasing agent cannot see why he should pay the higher price if this man's company can give him material for less money which is "about" as good, according to finisher's report. He purchases a drum of, we'll say, the "lacquer sealer," and is assured it will be all right under their present lacquer.

The purchasing agent asks calmly, "How many square feet of surface will your material cover?" The salesman shudders but has made good progress this far and, knowing by this time the insufficient knowledge of the purchasing agent, proudly gives his best estimate in square feet per gallon. The salesman momentarily forgets that his estimate goes to the finisher who has heard such tales before. This new material goes to the finishing department to be tested, and the "estimated" coverage per gallon is found to compare more favorably with the congressional C.W.A. appropriations than with the actual coverage.

Discussing it With the Salesman

The salesman returns and finds things not so good. The purchasing agent has explained to the manager the new materials and said manager is called in to meet the salesman. The salesman is asked to explain the materials, their advantages and the reasons why they should be used. He explains them from a technically trained standpoint much to the delight of said purchasing agent. The purchasing agent again hears some interesting discussions (with which he later bombards visiting salesmen).

The manager is informed a sample has been sent in and tested, said test is discussed, the finisher is called in to review his test, which is not 100% in accord with the salesman's claims. The salesman feels and expresses himself to the effect that his material has not been given the proper test. The finisher feels the insinuation. The manager is spending valuable time. By this time the drum of material has also arrived and the finisher puts some questions to the salesman, as he wishes all the information he can get before he begins using the material.

The Salesman's Downfall

Here the salesman falls flat and shows himself merely a "peddler". He has not had practical training, so cannot help the man who is to use his products. The purchasing agent has sure put the salesman on the spot unknowingly.

What the Finisher Does

The finisher begins to use from the drum of new sealer and soon finds a bit of orange peel effect if sprayed at the same pressure used on their regular sealer. A certain amount of time is spent in determining the correct pressure, and to find out if the material can be diluted or needs diluting. It is found to sand less rapidly, and again time is spent over and

above the allotted amount allowed for the job going through. The cost-accounting department reports the increase to the manager who, in turn, calls the finisher foreman who explains the higher cost. In the time he is "on the mat" he explains the material came in unknown to him, that is, not ordered by him. These little "shin digs" are handed down to each other in turn and also to friend salesman on his next arrival. The manager even suggests he should pay the added cost.

This new sealer may have worked all right under the regular lacquer. Of course, if it had not the ever-watchful finisher would have noticed it. The purchasing agent naturally included the drum of new sealer in his stock along with the regular materials, so if it had not worked all right the finisher would have been a bit "up in the air," to say nothing of the handicap under which he would have to work to keep his production schedule near standard and the quality of the finished product also up to their present standard.

How many of these episodes could have been avoided and overcome by the better training of both parties?

A "Pain in the Neck"

By the time the reader has reached this point, he will probably try to form an opinion as to whether the writer is a salesman or a purchasing agent, or to judge by his writing many over-confident men in these positions will say: "He's just a pain in the neck". Well, gentlemen, I am neither salesman nor purchasing agent, but I have contacted both and I have found both qualified and unqualified men in these respective positions.

Undoubtedly it will bring both smiles and expressions of anger to some of the faces of the men in these positions. I only hope it will make some of the more confident men ask themselves this question: "In which class do I fall?"

"Six Pounds to the Gallon"

Let me cite one incident that gave me a bit of pleasure which, of course, could not be registered at the time. As I walked through a certain plant with the factory manager, who was an expert finisher, formerly on the floor in that plant, and also the man who bought all the finishing materials, I remarked casually about the very high air pressure used at the spray guns, and also the too-high pressure on the shipping container the material came in. I asked if it was a heavy-bodied material, if it was of high viscosity, or if it was a high-solids lacquer. He promptly informed me it was a very high-solids material. This brought the question: "What percentage of solids does it carry?"

"Six pounds to the gallon," was the answer. A high-solids lacquer . . . eh, what?

The reader may wonder why I have abruptly ended by digression of the "after 'send me a sample' " episode. One could go on and on with this. Many more things could have been put down, but I have touched just a few of the tips on the often up-and-down roads these boys must travel.

May this article bring the questions of what might have and what could have happened, over and above the few points cited, to the minds of those concerned.

Why Lacquer Blushes —and How to Prevent It

by Albert F. Byers
Benjamin Franklin Paint & Varnish Co.

What causes lacquers to blush, what the weather and the thinners have to do with it, and what the finisher can do to counteract this tendency.

★ ★ ★

BLUSHING MAY have been fashionable among the young ladies of the gay nineties, but it always was, and still is, out of place in a lacquer. Yet some lacquers practice this annoying habit almost continually, while even the best lacquer may lapse into it now and then—particularly on damp days—if the proper precautions are not taken.

When lacquer blushes, a grayish or white cast gathers on its surface. This is due to the precipitation of part of the solid content of the lacquer, which gives the surface an opaque appearance.

There are several ways to explain the cause of blushing, but perhaps the simplest is to say that it is caused in a broad sense, by the same agents that cause dew and rain. Some scientific wizard achieved fame, we hear, by producing an artificial indoor thunder storm; but many a finisher has produced artificial indoor rainstorms (which were too minute to identify as rain) while applying lacquer—only instead of fame it merely brought him trouble.

But what causes rain? We could all answer this one when we were schoolboys, but have probably forgotten by now, so let's get out that old natural science book that used to bore us so. We find that clouds contain water in the form of vapor. The heat of the sun changes (evaporates) the water on the earth to vapor and the vapor collects in clouds. Since heat changed the water to vapor, cold will change the vapor back again into water. And then you will have rain (only if the cloud gets a real chill it will start to snow). This is called "condensation"—unless you get caught in it without an umbrella, in which case you will probably call it something else.

Well, this is pretty much what happens when a lacquer blushes. The surface of the freshly applied lacquer corresponds to the earth's surface, except that there is no water on it. The atmosphere of the spray room corresponds to the

Excerpts from "Lacquer Ailments . . . and Solvents," the second of a series of bulletins prepared for use by the Benjamin Franklin Paint & Varnish Co., Philadelphia, Pa.

earth's atmosphere, except that there are no clouds. However, there is water vapor present in the air, so to that extent we might say that there was an invisible cloud in the spray room. When any of the vapor in this invisible cloud becomes chilled it condenses. The surface of the wet lacquer cools the immediately surrounding film of air, and this air condenses its vapor in the form of tiny drops of water, which are deposited on the lacquered surface. This moisture precipitates some of the nitrocellulose or other constituents of the lacquer, which produces blushing.

Broadly speaking, there are two methods of preventing blushing. One is physical and the other chemical.

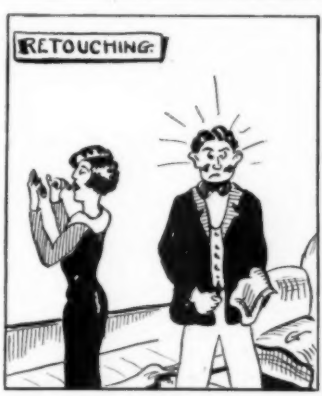
The physical method is fairly obvious; prevent any draft from striking the freshly finished surface, as a draft will cause the solvent to vaporize more rapidly, thus further lowering the already lowered surface temperature, and increasing the tendency of the atmosphere vapor to condense. Also, keep the temperature of the finishing room high enough to lower the relative humidity of the atmosphere to the proper point, which should not be above 70° or 75°F.

The Chemistry of Blushing

The chemical method is naturally somewhat technical, but even an introductory knowledge of it might prevent the finisher from making mistakes that would inevitably lead to blushing. He may, for instance, believe that a lacquer thinner is simply a lacquer thinner and that one thinner is the same as another. Suppose, on a day when the air is full of moisture, he thins his lacquer with the first thinner at hand, and suppose that this thinner happens to contain a very large percentage of methyl alcohol or methyl acetate. Blushing is almost sure to result—although he may have gotten by with this solvent on very dry days.

To understand the cause of this, it is necessary to understand why the air film next to the lacquered surface is cooled while the lacquer is drying. If you have ever put your hand in ordinary alcohol or other volatile solvent having a low boiling point,* you will recall a sensation of cold. Your hand did not feel cold as long as it was immersed in the solvent, but only when you drew it out and exposed it to the air.

*As a general rule, solvents having low boiling points vaporize more quickly than solvents having high boiling points. Therefore, throughout this article, boiling point refers not only to the relative amounts of heat required to cause the solvents in question to boil, but also to the rate of evaporation. Thus, instead of saying a solvent "vaporizes rapidly," we say it has a "low boiling point" or that it is a "low-boiler."



This was true because the solvent, in vaporizing, absorbed heat. All solvents do this, but the quicker a solvent vaporizes, the more heat it absorbs. In every chemical and physical action, wherever anything moves (and everything does move, from atoms to stars) heat is either generated or absorbed; however, it is not always perceptible.

We speak of this cooling of the air film next to the lacquered surface in terms of heat, since cold, as an entity, does not exist. It is merely absence of heat. We measure cold in degrees of heat, and the freezing point for one substance may be the boiling point for another.

Lacquer Thinners—and Their Characteristics

Here is a table of formulas that shows why one solvent will cause blushing more than another, and which type of solvent has this tendency in the greatest degrees.

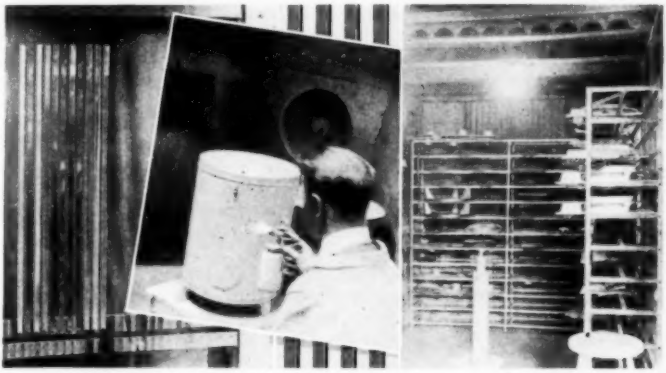
Acetate Esters

Methyl $C_2H_3O.O.CH_3$
Ethyl $C_2H_3O.O.C_2H_5$
Propyl $C_2H_3O.O.C_3H_7$
Butyl $C_2H_3O.O.C_4H_9$
Amyl $C_2H_3O.O.C_5H_{11}$
Hexyl $C_2H_3O.O.C_6H_{13}$
Heptyl $C_2H_3O.O.C_7H_{15}$
Octyl $C_2H_3O.O.C_8H_{17}$

Acetate esters of alcohol are (like most organic compounds) composed of carbon, hydrogen and oxygen. But note in the above table that while the C_2H_3O radical of the acetate ester remains constant, the second carbon (C) and hydrogen (H) atoms undergo a progressive change. As these elements recruit new atoms to their ranks (shown by the numerals below and to the right of the symbols) the entire compound becomes less and less volatile. That is, it vaporizes more slowly, thereby having less tendency to condense water (since it absorbs heat less rapidly) and as a result lessening the tendency toward blushing.

Therefore if you would prevent blushing, avoid using a thinner that has too high a percentage of low-boiling or very volatile solvent in its composition. A good thinner has just the proper balance of high and low boiling solvents. What that proportion is depends upon too many varying factors to be always the same; and so we repeat that a thinner excellent for one purpose or for one lacquer may be unsatisfactory for another. So the above table is not intended as a guide in the selection of a good thinner, but as a method of enabling the finisher to tell from the name of a solvent of this class or its chemical formula what its relative volatilization speed will be. And this speed affects not only blushing, but also drying; since naturally the more quickly its solvents vaporize the more rapidly will the lacquer dry.

You can, of course, experiment with various solvents. But as the most reputable lacquer manufacturers have made a study of blushing and its prevention, it would be more economical to let them solve the problem for you. Blush retardants have been compounded which give excellent results. They are solvent for nitrocellulose and introduce enough high-boiler to prevent blushing. The proper proportion to use varies—in some cases being from a pint to a quart of retardant to each five gallons of lacquer.



Left—Flexible metal bands are hooked up and drawn straight while the finish coating dries. Center—Spraying the cylindrical casing of a small water-heater. Right—Finished frames and grilles in the drying rack.

Finishing Electric Heaters

by Howard Burns
Thermador Electrical Mfg. Co.

PRODUCTS manufactured by the Thermador Electrical Mfg. Co. of Los Angeles, Calif., include electric water-heaters and electric air-heaters of different types; also the fan-type heater which provides a quick and even circulation of heated air throughout a room, instead of allowing most of the heat to rise near the ceiling.

As these products, the principal parts of which are steel and aluminum, are extensively used in the finer homes, offices and apartment buildings, extreme care is taken to provide an attractive and durable finish. Standard colors used are ivory, plain brown and brown wrinkle lacquer, although the finish is sometimes varied on special order.

For the aluminum frames and grilles of the air-heaters, the brown wrinkle lacquer is a popular finish. They are first prepared by being dipped for about two minutes in a hot solution of caustic cleaner. This etches the aluminum and turns it black, slightly roughing the smooth surface so that a finish will stick to it better. The piece is rinsed in hot water and then immersed in a solution of nitric and sulphuric acid until the aluminum is a pure white. This usually takes about five minutes. It is then rinsed

again thoroughly in cold running water, to remove all acid.

The lacquer is next sprayed on, almost heavy enough to run, and the piece is put into an electric oven and baked at a temperature of 260° to 300°F. for three hours. It is then allowed to cool and set for 12 hours, after which the brown finish coat is applied. Some other color may be used for this coat if desired, since the wrinkle effect was obtained by the first coat, which was baked.

In applying the ivory color to these frames and grilles, a primer coat is applied and allowed to dry about 15 minutes. This is followed by from one to three coats of color lacquer, each coat drying on an average of about 30 minutes, depending on the weather. Usually, however, the primer coat is applied to a supply of the parts and they are stored in the drying room until needed to be finished and assembled.

The jackets and other steel parts of both the water-heaters and air-heaters are first cleaned by wiping the surfaces thoroughly with a cloth dampened by thinner; then they are sprayed with a gray primer. When this primer has thoroughly dried (using a fan-type heater in bad weather to hasten the drying) from one to two color coats are sprayed on, each coat drying on an average of about 30 minutes. The outer jackets of the water heaters are usually finished in two tones—the body in the lighter tone while the top and band are of a darker shade.

A special device for drying the narrow steel bands consists of small metal pins in a horizontal strip of wood, over which the bottom end of the bands are hooked, and small hooks with coiled springs on a similar board at the top (see illustration at beginning of this article). The springs keep the bands taut and prevent them from touching anything while drying. A number of shelves, made from light angles and straps, are used in the drying room where frames and grilles are air dried.

Dust Collector Bulletin

Pangborn Corporation of Hagerstown, Md., has just issued a new 24-page bulletin (8½x11-in.) on their Type "CH" all-metal, cloth-screen, dust collector. This is one of the most complete catalogs published to describe and illustrate the many exclusive and new features not previously available in this class of equipment. Many large photographs, charts and drawings clearly illustrate the 14 outstanding points of superiority claimed for this new collector.

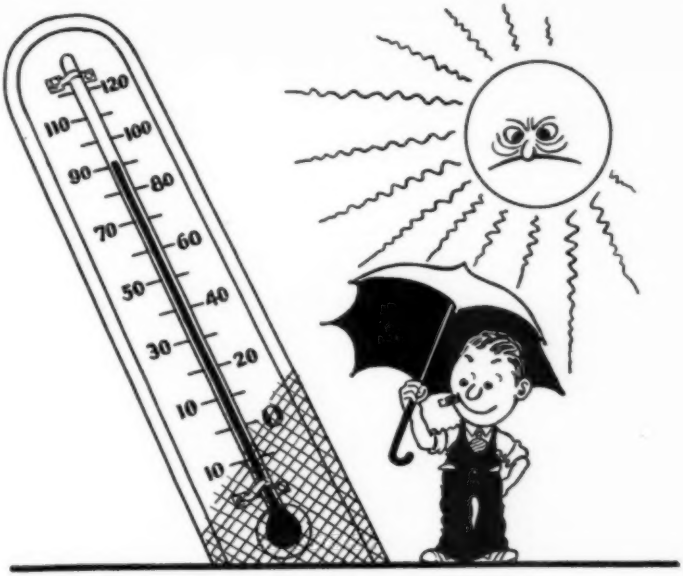
A free copy may be had by sending your inquiry to this magazine or by writing direct to Pangborn Corporation, Hagerstown, Md.

Metal Degreasing Business Acquired by DuPont

The metal degreasing business (cleaning equipment, solvent, methods, etc.) formerly handled as a division of the Carrier Engineering Corp., Newark, N. J., has been acquired by E. I. DuPont DeNemours & Co., and is now under the direction of its R & H Chemical Department.

Quoting from a letter from this division of DuPont:

"The present day commercially practicable processes of solvent degreasing involve a considerable number of patents (at least 40). These patents cover processes, apparatus and in some cases the solvents. The use of vapors or the "Vapor Degreasing" process is thoroughly covered by a number of these patents. There are three companies in this country who are licensed under all of these patents to make and sell the patented degreasing equipment and solvent. These companies (in addition to DuPont) are the Rex Products & Mfg. Co., Detroit, Mich., and G. S. Blakeslee & Co., Chicago.



We can't control the temperature . . . But we can soften its effect

It is ridiculous, of course, to imagine that we can control the weather. But thousands of manufacturers, makers of outdoor metal lamps, signs, store fronts, doors, etc., will tell you we've forced Old Man Sun to act a bit more kindly toward metal surfaces which are exposed to the elements.

We've done it with Actino*—a lacquer expressly developed for outdoor service. Winter and summer, rain or shine—its function is to protect the metal from rust, tarnish, and other forms of corrosion. We call it Actino* because it successfully resists the attack of the actinic rays of the sun.

Try Actino*! Prove to yourself that the sun is no longer the omnipotent factor that it once was. Actino* has it *stymied*.

*Reg. U. S. Pat. Off.

EGYPTIAN · LACQUER

THE EGYPTIAN LACQUER MFG. CO. ● 90 WEST STREET, NEW YORK

Furniture Manufacturers Improve Your Finishes!

Have you been losing sales in Eastern markets or in any other territory, and do you know why? Perhaps here's the answer.

by Philip Myers

Mr. Philip Myers,
Corona, L. I., N. Y. C.

Dear Mr. Myers:

Referring to your inquiry as to how much a good finish will support and induce a sale, please be advised that it has always been our contention that a good finish is the outstanding fact in promoting our merchandise to a discriminate buyer.

When a finish of good quality stands out, many defects may be overlooked.

It is for that reason that we use great care in selecting our sources of supply, and to assure ourselves that we have an outstanding finish we have time and again taken advantage of our association by asking you to inspect and pass upon the merchandise we intend to sell, and by doing this for us you have placed us in a position to procure and promote volume sales.

With best wishes and more power to you in your stand for better finish, we remain,

Very truly yours,
HOCHMAN-FRELING CO.
J. J. Hochman.
NEW YORK, N. Y.

FURNITURE buyers and jobbers are demanding a better and more durable finish from their sources of supply. They are emphasizing the fact that careful attention must be given to the finish before shipment is made. Recently one buyer wrote to a furniture manufacturer to the effect that the automobile people were improving their finishes, but that furniture finishes were on a down grade, notwithstanding the fact that in many cases the same companies were supplying finishing materials to both industries.

Is it possible our furniture manufacturers are spending more effort on design and less on their finishes . . . that with rising costs in labor and material, manufacturers are laboring under the delusion that a skimpy finish will get by . . . or are they using a cheaper grade of material, believing that by so doing they can overcome their obstacles in meeting competition? These fallacies are proving to be serious boomerangs in the furniture industry.

Several months ago a New Jersey manufacturer of baby carriages called me in and told me

Attention VALUE....

That which draws your attention to this page . . . beauty, charm, grace . . . will likewise draw attention to your product. Decorating your particular product with human figures may be quite inappropriate . . . but every commodity lends itself to beauty in finish in one form or another. Our creative studio can help you solve that problem. There is no charge nor obligation for this service. Will you use it?

Rockford Varnish Co.
ROCKFORD, ILLINOIS

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he was having considerable trouble with his finish. He asked my advice on how to overcome it. Upon investigating I found that for many years his finish was the outstanding feature of his product. He had used a full lacquer enamel or pyroxylin finish, but recently, on account of an increase in the price of this material he had changed to oil enamels, also synthetics, etc. . . . trying to offset the higher cost of lacquer.

There is no doubt that this could have been done, but I pointed out to him that he was experimenting under production, which is one of the greatest possible sources of trouble. The cure for the higher cost was worse than the disease. I immediately advised him to go back to his old schedule if he desired to stay in business, and that in the meantime I would work out a different method. He acceded, and in the course of time, through experiments and tests, a schedule was arrived at where synthetic enamels could be used and were acceptable to his trade. It is true it was a costly lesson, but many manufacturers are making the same blunders today. I hope I have made the illustration so clear that other manufacturers will avoid the same error.

I Inspect Some Furniture

Later I was called in by one of the largest department stores of New York, whose warehouse is in Long Island City, to examine and inspect several pieces of furniture in reference to 1) quality of finish, and 2) construction. This seemed to me an unusual procedure inasmuch as I was neutral, that is, not representing any manufacturer. I was given to understand that my opinion was sought in an advisory capacity, and that it was to be used as a yardstick in deciding which sources of supply to favor with future purchases. Lately, they reported, customers' complaints had become very numerous . . . sufficient to change their profits into losses . . . because of so many exchanges

Mr. Philip Myers,
35-28 99th St.,
Corona, Long Island.
Dear Mr. Myers:

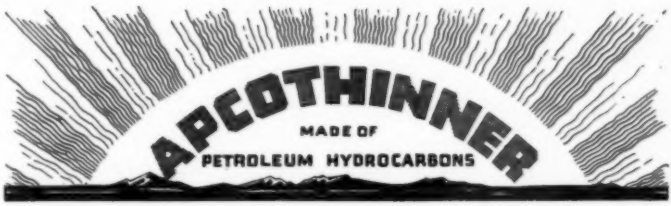
Confirming your letter of June 26th, in reference to finishes, from my experience for the past 24 years of department store buying, I would state that finishes have always been the determining factor. I must emphasize the fact that from some unknown cause in the last year, we have been having considerable complaints in regard to the finishes. This we attribute to carelessness, poor material, or probably a misapplication, or in the majority of instances, cheap labor and cheap material.

Therefore, we feel compelled, before lining up with any manufacturer, to see that his finishes are of the best grade, regardless of what the cost may be. In many cases we call on expert advice for opinions on finished productions, as to their probable durability.

Yours truly,
KAUFMAN & MAHRER, INC.
By M. Landesman,
Secretary-Treasurer.
41 UNION SQUARE,
NEW YORK, N. Y.

Author's Note: Mr. Landesman, who wrote the above letter, was buyer for Macys of New York for 5 years; buyer for Gimbel Bros. of New York, 7 years; buyer for Rosenbaum of Pittsburgh, 2 years.

THERE IS SOMETHING NEW IN THE SUN!



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In dipping tanks, baking ovens, spray guns or with brushes, controlled viscosity greatly eliminates sagging, beading, pinholing or brush marks. APCOTHINNER is one Petroleum Thinner that has proven its merit for practically every type of industry from New England through the Middle West. (Research data available for your problem.)

The alert chemist has found that the new synthetic resin finishes (sometimes referred to as 4-hour enamels) have less tendency to printing and undue tackiness when APCOTHINNER is used — that our Research Bulletin No. 12, "APCOTHINNER in ALKY RESIN VARNISHES" is an outstanding example of our technical cooperation with industry.

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and rebates they were obliged to give.

The executive who had charge of this novel experiment was serious about the matter, and told me there were 35 pieces of furniture to inspect. Each one was numbered, as the manufacturer's identity had been removed—this to enable me to give an honest opinion without any prejudice or favoritism. My report was to be in written form about each individual piece, signed and sealed and given in person to the chief executive.

I believe at this time I should mention the kind of furniture inspected, for I am sure that if this article comes to the notice of some of the manufacturers who are supplying the Eastern trade, they will understand why they have had many complaints in recent months, plus returns . . . and in many instances they have lost some of their best accounts. Let us hope they will profit by this experience, and that a "Better Finish" will be their slogan in the future.

I inspected 35 pieces which consisted of bedroom, dining room, novelty and nursery furniture, both as to finish and construction. To simplify my inspection I classified them in the following code:

A—Excellent

B—Fair

C—Commercial

The result was 10 pieces were given a C grade as to finish, and 25 were rejected on account of faulty finish. The construction had a better showing, namely, 15-A, 8-B, 6-C, and 6 were rejected on account of poor gluing and poor cabinet work. The result of this analysis supports my theory that more attention is given to design and construction than to the finish.

What Was Wrong with the Finish

I will now give a summary of the causes for rejection because of faulty finish, so that executives may have something definite for future guidance.

1) Many tool marks and scratches showed under the finish. These could easily have been removed to present a smooth surface before application of the first coat of finishing material.

2) Staining was very poor, in some cases causing various shades. This may have been caused by omitting a toning-up operation. Again, a water stain may have been used, the sponging that usually precedes it having been omitted thereby causing the grain to raise considerably, and making it necessary to sand the stain . . . removing some of the color . . . and omitting an evening-up operation before applying the filler.

3) Filler had not been properly cleaned off, thereby causing a muddy appearance. In several instances the filler used had no filling qualities, and open pores were prominent.

4) In corners and mouldings the filler had not been removed . . . showing negligence in not having used a pick to remove same.

5) Some pieces, which had a final finishing coat of flat varnish, showed several runs on the ends, but worst of all the tops had been rubbed down to a semi-gloss. The fronts and sides had received no rubbing at all. The variation was so drastic and prominent it reminded me of a man with his suit

pressed, and a clean shirt, but wearing a dirty slouchy pair of shoes. Here a beautiful reproduction, which some designer had been commended on, had been murdered for the price of 15 to 20 minutes of labor. Why?

6) Where lacquer had been used and parts were slightly marred, it showed white. Possibly this was caused in packing. Here I suggested a tougher lacquer should be used, as many flat lacquers have a tendency to do this; extra precautions should be taken in selecting the correct material which we know can be had.

7) Where there had been some patching, all of the burn-ins were very prominent, which can only be accounted for as being due to faulty workmanship in not smoothing them out. This is one fault that every finishing foreman should give more attention to, as a faulty burn-in (a patch put in with stick shellac and a hot knife) has a tendency to magnify the defect.

8) There were several pieces in colors. Some of these looked fairly good, but on careful examination the lower parts, especially under the turnings, were almost bare; little or no material had ever been applied there. This fault can nearly always be found in factories where the spray booths are not equipped with air-lifts by which the work can be raised or lowered . . . so the operator does not have to lie on the floor to apply material to the lower extremities.

I believe this article reveals to what extent buyers are going in demanding a better finish. A quality finish can always be maintained if manufacturers will realize that sales absolutely depend upon it. Always remember that a poor material makes a shoddy job, and that a good material poorly applied is even worse. I want to emphasize the fact that a good finish will overcome practically all complaints and eventually lead to better sales.

To support my theory I wrote to several buyers asking their opinion as to what they considered was the outstanding importance in purchasing furniture, and in every instance the finish was voted as being the most important (see letters reprinted in this article).

Spray Gun Bulletin

A 4-page 8½x11-in. bulletin released by H. D. B. Corp., H. D. Binks, President, 900 N. Spaulding Ave., Chicago, Ill., illustrates, describes and explains the merits of the new H. D. B. Model No. 5 spray gun for production. Quoting a paragraph from the bulletin:

"The one-piece air nozzle should appeal to all users of spray guns. The new grooved construction eliminates all possibility of clogging and eventual destruction."

Alsop's New Catalog of Filters, Mixers, Pumps

A new catalogue of Hy-Speed liquid processing equipment has just been issued by the Alsop Engineering Corp., 39 West 60th St., New York City.

During the past few months several new units have been developed and perfected by the company engineers. Among the new machines introduced in recent weeks are: an automatic vacuum bottle-filler, a syphon bottle-filler, revolving accumulating tables, and new ultra-fine disc filters. The portable vacuum bottle-filler, a popular Hy-Speed model for many years, has been redesigned.

The catalogue (32 illustrated pages 8½x10¾-in.) tells in full, the story of all these new machines and gives complete details about the rest of the Hy-Speed line of liquid handling equipment including portable electric mixers, mixing units, glass-coated tanks, etc.

Spraying Flock

by W. B. Crawford
Binks Manufacturing Company

Flock is a fine, dry, fluffy material made of cotton, rayon or wool, which, when properly sifted and sprayed over a tacky sizing coat, produces a soft, short-napped, velvety, suede-like surface. Flock finishes are available in practically all colors and in many tints, tones and shades of the leading colors.

The flock finish can be applied to any surface to which a sizing coat will adhere. It can be applied in one solid color or in various patterns of different colors, and it can be sprayed through stencils. It makes a durable finish and can be cleaned by brushing it with a dry, stiff brush. The rate of coverage is about 40-sq.ft. per pound.

▼ ▼ ▼

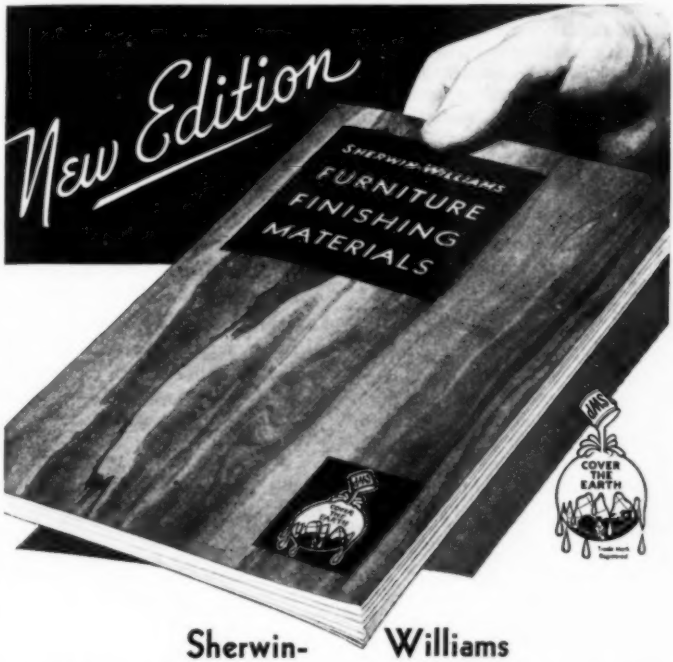
BEFORE SPRAYING flock, the surface to be sprayed must be thoroughly cleaned, dried and then treated with a coat of suitable sizing material. The sizing, which is selected to correspond in color to the finish coat, is sprayed in the same manner as varnish or lacquer. Care must be exercised to get this sizing coat to the proper consistency. If it is too heavy it will soak into the flock. If it is put on too lightly and thinly it will dry too rapidly and the flock will not stick to it. It is necessary to apply flock soon after spraying the sizing; in other words, spray the flock while the sizing coat is still wet or tacky. If the sizing coat becomes set before the flock can be sprayed on, it can be restored to its wet or tacky condition by spraying it with suitable thinner for this purpose.

Air Regulation

An oil-and-water extractor, with an air regulator and pressure gauge, should be used to remove all trace of oil and moisture from the compressed-air pipe line which supplies air for spraying, as the presence of oil or moisture will cause the flock to lump and spread unevenly. Set the air regulator for a pressure of not more than 25 to 30-lbs. The air regulator will maintain this air pressure uniformly; a greater pressure will waste material. Do not use an ordinary shut-off cock to regulate air pressure.

Preparing Flock for Spraying

It is of the greatest importance to prepare the flock properly before attempting to spray it. While it is generally recommended that the flock be carefully sifted through an ordinary flour sifter to remove any lumps or coarse particles before spraying, there are exceptions to this rule.



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Here's a book that's "worth its weight in gold." The Sherwin-Williams line of furniture finishes includes every type of material used by furniture manufacturers—lacquers, varnishes, stains, fillers, thinners—*everything*. This book gives you information about all of them—including many *new*, *exclusive* and *improved* products which cut the *time and material cost* of finishing and give *better final results*. Many furniture manufacturers have found that these newer and better finishes point the way to increased *profits* at *decreased* production cost. We think you'll be interested.

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SHERWIN-WILLIAMS
INDUSTRIAL FINISHES

Some firms have found that they can dispense with this preliminary sifting provided their supply of flock reaches them in the ideal, dry, fluffy condition, and is kept and used that way. It is such a great saving in doing this that it more than compensates for the little time that may be lost when only an occasional small lump of flock gets through the gun and onto the finished surface, and has to be removed by hand and the place re-sprayed.

In other cases, instead of sifting the flock, it is shot through the spray gun and caught in the reclaiming screen to break it up and get it into the light, dry, fluffy condition which makes it ideal for spraying. If any of the flock has become lumpy, due to moisture absorbed from the air, place the flock in a warm oven to thoroughly dry it before sifting or otherwise conditioning it for spraying.

The operator will be more than repaid in the long run for the time he devotes to properly preparing the flock before he sprays it, as everything will be ready for him to proceed smoothly, accurately and with reasonable speed, and he will have a finer quality of workmanship to show for his efforts.

Adjusting the Spray Gun

Usually there are three air adjustments on a flock gun. One of these controls the air passing through the center port of the gun; the second governs the air through the side ports and determines whether a round or flat spray is to be delivered; the third regulates the air that is introduced into the cup in order to keep the material in suspension in the upper part of the cup.

While flock finish is used to produce purely decorative effects on many articles, it is also finding new uses where it serves primarily as a recognized improvement over something else in point of utility, convenience or economy. For example, the handles of some high-grade baseball bats are now being flock-finished to give the batsman a firmer, surer grip on his bat—saving him from having to resort to his customary practice of removing the too-smooth, too-highly polished varnish or lacquer coating from the handles of newly purchased baseball bats.

▼ ▼ ▼ ▼ ▼

These adjustments are in addition to the button or trigger on the gun.

To set up the proper operating air pressure, close all of the spray gun adjustments and remove the container from the gun; next, press the button or trigger on the gun and open the adjustment controlling the air through the center port about a quarter of a turn, and then adjust the air regulator in the air line to 20-lbs. air pressure.

Release pressure from the button or trigger and replace the container which should be filled not more than two-thirds full. Press button or trigger again and slowly open the adjustment controlling air to the container until the proper amount of flock is being delivered. With these two adjustments opened, the gun will deliver a round spray. By opening the adjustment regulating the air to the side ports the spray will become flat; the more it is opened

the wider will be the flat, fan-like spray.

Really the knowledge and skill involved in making these fine spray adjustments is only acquired through practical experience. As a rule, adjustments on the gun must be changed from time to time during the course of several hours of spraying the same flock on the same work, due to slight variations in the condition of the flock, as for example its degree of lightness, dryness and fluffiness. The operator soon learns how to accurately judge the condition of his flock, the operation of his gun and the results he is getting, and he knows when and how much his spray gun adjustments need to be changed in order to maintain the same quality of workmanship.

Changing to a flat spray will necessitate further opening of the air adjustment to the cup in order to deliver an increased amount of material by the gun. If sufficient material can not be delivered by opening this adjustment all the way, then it will be advisable to increase the air pressure to the gun from 20-lbs. to between 25 and 30-lbs.

Where steady spraying is under way, it is the practice of some operators to have a helper, or the sizing-coat sprayer, keep several flock containers (generally Mason fruit jars) properly filled and in readiness so the flock sprayer can make quick changes — removing the empty container from the spray gun and replacing it with a filled container as he needs it.

Reclaiming the Flock

Both the sizing and the flock can be sprayed in the same spray booth, but for production jobs this is not practical. The better plan is to put on the sizing coat in a regular spray booth, such as is used for varnish or lacquer, and then spray the flock in a new type of flock spray booth which is especially adapted to trapping flock that does not stick to the sized surfaces being sprayed. This trapped flock can be used again.

Where any considerable amount of flock is being sprayed, one of the regular reclaiming type booths will soon pay for itself with the amount of flock that can be salvaged. However, it is possible, in an emergency, to arrange a standard spray booth for the spraying of flock by lining it with clean dry paper and placing a basket-shaped screen of 60-mesh wire over the exhaust opening.

In case the flock has not been sprayed in some type of reclaiming flock booth (as for example, in some experimental work or short-order work done under make-shift conditions), there will probably be some excess flock remaining on the freshly sprayed surfaces. This surplus flock must be removed when the flock-coated surface is dry. Any one of several methods may be employed for this purpose, depending upon the shape, size and weight of the articles that have been finished. The excess flock may be brushed off with a stiff bristle brush, or blown

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off with a light blast of air, or a vacuum cleaning device may be used. The vacuum method minimizes the amount of fine fluffy flock in the air, and it permits easy collection of the excess flock in bags.

Flexible Lacquer for Cables and Fabrics

AN UNUSUALLY flexible and durable high-tension-cable lacquer has recently been developed by one of the foremost manufacturers in the industry. Besides requiring fewer coats than are usually needed to build up a deep finish, a new ingredient gives the finished cable remarkable flexibility and smoothness.

The addition of this new element to H. T. cable lacquers enables the cable to better withstand the severest specified tests, and yet leaves the finish in perfect condition. This same ingredient has proved so satisfactory that it is being used in the manufacture of coating lacquers for rubber fabrics, leather, fishing lines, etc., to improve the appearance and durability without appreciably increasing the cost.

Coating Small Parts in Whirling Machine

WHILE excellent results may be and are obtained in the matter of coating small parts by tumbling them, tumbling is not the entire low-cost picture by any means. Whirling such articles in a centrifugal machine, and admitting the coating materials to the machine through a valve, allows of coating the parts completely, and of throwing off all excess material in the same operation. So complete is the throwing off of the excess which may be admitted to the machine that even threads in tapped holes of small castings are not clogged by the process. In some cases the finishing materials used in processes of this nature are admitted to the machine hot, while in others they are used cold. Whichever way they are used, the material thrown off in the form of excess is not wasted, but returns to the supply tank.—H. J. E.

C. W. Curts Becomes Advg. Mgr. of John Lucas & Co.

Charles W. Curts has been appointed Advertising Manager of John Lucas & Co., Inc. (Paint and Varnish Makers, Philadelphia, Pa.) He was formerly Sales and Advertising Manager of the General Scientific Corporation at Chicago, and at one time was Advertising Manager for Pinaud, Inc. He was associated for five years with the J. Walter Thompson Advertising Agency in New York City.

Bulletin on Paint Failures; Rust Proofing

Accompanying a bulletin on the above subject is a letter of explanation:

". . . 'Paint' includes, of course, all of the different types of enamels and lacquers, except vitreous enamel, in all of their various applications to iron and steel products, especially as they may be applied to sheet metal.

"While the development of alkali as a result of electro-chemical activity on iron or steel is not claimed to be a new discovery, the fact is not known generally, and it is to inform fabricators of iron and steel articles, that this bulletin is prepared for the Parker Rust-Proof Co., Detroit, Mich. It is a documentary demonstration of a little known phenomena, and points the way to methods for preventing it.

"It is our thought that your readers might be vitally interested in the problem of rust prevention under paint finishes . . . Copies will be sent to interested manufacturers, on request."

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These headings do not cover entirely the contents of The Chemical Formulary. Hundreds of other formulae are included. Even a languid perusal of its pages, cannot fail but give one at least a few valuable ideas.

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Finishing the metal surfaces of these chairs in colors, and in some cases in imitation wood grain, calls for properly cleaned metal sub-assemblies, high-grade materials, modern shop equipment and experienced workmanship.

Metal Office Chairs

by John Parker
Methods Dept., Do/More Chair Co.

A GOOD FINISH is an attraction and delight to the eye and to the touch, but a poor finish—one that is unsatisfactory in appearance, "feel" and durability—reflects discredit to an article and to the manufacturer, regardless of how well that article has been designed and manufactured in the white, or what its merits may be in point of utility, convenience and economy.

The quality of the finish on any article for the home or office has a dominate influence upon the purchaser's ultimate decision "to buy or not to buy." A quality finish that has been sprayed smoothly and evenly over a thoroughly clean surface, and then baked at a sufficiently high temperature to insure its hardness and preserve its luster and color, adds much value to any product in the metal furniture line.

It is through a recognition and appreciation of the above facts that the manufacturers of Do/More office chairs insist upon their products having a high quality finish both in point of appearance and durability. These "health chairs for correct posture" are in service in many of the largest offices of industry and business, where their merits have made them practically indispensable.

To insure great strength and durability in Do/More metal chairs, the joints which bear the principal strain are welded. As a result of this welding, we are presented with the first problem of preparing our chairs for the paint job. The excess metal and burrs around each weldel joint must be removed, and the joined surfaces must be smoothed out nicely to present a workmanlike appear-

Note: The chair illustrated above is a typical model for the stenographer or office clerk. The same make of chairs in more massive designs, heavier upholstering and arm rests, are included in the line as Executives' Chairs.

...tremely high temperatures and its salt atmosphere, the finish on motor busses has a tough job. The salt air has a corroding influence which is very destructive, and a large portion of our route is within a stone's throw of the ocean. Since we've been using lacquer—and that's a number of years now—we have never noticed any deterioration of the finish which could be attributed to the effect of the salt air. The lacquer on our busses stands up fine, and keeps its beauty. And of course, we appreciate the speed and convenience of lacquer, and the ease with which it 'spot-repairs.' All these advantages of lacquer mean real economy in maintenance work."

OF SUPERIORITY

1 Lacquer dries rapidly—in minutes, not hours.
2 Lacquer dries hard—and remains so.
3 Lacquer is print-proof.
4 Lacquer is stable in the drum or can; no seeds; no granules; no "skinning."
5 Lacquer produces a clean surface, free from nibs, grit, and dirt.
6 Lacquer does not water-spot—it is washable.
7 Lacquer cleans more easily—it is alkali as well as acid-proof.
8 Lacquer is stain-proof.
9 Lacquer will not wrinkle—all coats unite into one uniform film.
10 Lacquer "touches-up" perfectly.
11 Lacquers can be "tailor-made" to fit many special uses.
12 Lacquer is longer-lived and retains its beauty.

COMMERCIAL SOLVENTS CORPORATION
230 PARK AVENUE · NEW YORK, N. Y.
Plants at TERRE HAUTE, INDIANA and PEORIA, ILLINOIS

While Commercial Solvents Corporation does not manufacture lacquer, it supplies the coatings industry with important materials—Butanol and Butyl Acetate C. S. C.—which are determining factors in lacquer quality.

BUTANOL *Assures* LACQUER QUALITY

ance. This is done by cutting away most of the excess metal with a tapered milling cutter which is driven by a flexible shaft to give the tool accessibility; then we finish off the job with a file.

The chairs are put through the finishing department in sub-assemblies. When the burring operation is completed these sub-assemblies are loaded onto specially-constructed portable racks and moved into a gas-fired oven for the burning off of all oil, grease and other foreign matter that may have stuck to the metal surfaces. An oven temperature of 500° to 600°F. is maintained for 30 minutes for this burning-off operation.

To Spray Booths

Upon removal from the oven the chair parts are allowed to cool; then they are moved in the same portable rack to a spray booth where another portable rack has been placed in readiness by the spray operator's helper to receive the parts or sub-assemblies after they have been sprayed. Before any metal is sprayed with paint, the spray operator's helper cleans off all dust and other residue by blowing the surface with compressed air and then wiping it with a soft cloth, preferably cheesecloth which does not leave any threads or lint on the surface.

After the parts are wiped clean the helper places them in position for the spray operator, and then, as rapidly as they are sprayed, he transfers them to the empty rack. Due to variations in the shapes and sizes of the sub-assemblies, special arrangements are necessary for holding these parts while they are being sprayed. For example, a small turntable is used to support the chair bases; other parts, which are smaller, are suspended from swiveled wire hooks so they can be easily turned to permit the spray to strike all exposed faces.

To the Baking Oven

When one of these portable racks has been loaded with freshly painted parts, it is rolled to the baking oven, and another rack of unfinished parts is transferred to the spray booth where the parts are cleaned and spray coated and then moved to the baking oven also. As soon as the oven is loaded the doors are closed and the painted parts are baked 1½ hours at a temperature of 250°F. This baking of the coating insures a hard, tough finish and preserves the luster of the paint.

One-Coat and Two-Coat Jobs

We turn out both one-coat and two-coat bake finish jobs — the two-coat jobs being for the more expensive chairs. For the two-coat jobs we use a prime coat which is sprayed on and baked as just described for a single-coat job. Before the enamel coat is sprayed on, the surface of the baked prime coat is lightly sanded with very fine sandpaper so it will present a perfectly smooth finished surface to receive the enamel. The prime-coated surfaces are all carefully sanded and inspected before being moved to the spray booth for the enamel coat. The enamel finish is baked for two hours at 250°F. When removed from the oven it presents a beautifully finished smooth surface which is now ready for assembly and packing.

GREATER DEPTH in WOOD LACQUERS

Can now be obtained with the newest M & W achievement in Wood Finishes.

WOOD SEALER No. 725
CLEAR WOOD LACQUER No. 726

These Quality materials *go beyond* the ordinary build, depth and toughness obtained in two spray coats of Lacquer.

One coat Sealer and two coats Lacquer are equivalent to two coats of Varnish.

May we send you further particulars?

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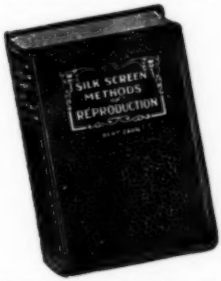
NRA WE DO OUR PART

SILK SCREEN METHODS of REPRODUCTION



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Super synthetic air-dry and bake enamels are now being offered by a manufacturer as the last word in one-coat finishes for application on either wood or metal. Extreme hardness and flexibility are claimed and, due to their unusual flowing qualities, they can be sprayed, dipped or tumbled with ease, to an unusually smooth, high-gloss or eggshell finish as may be required.

Metal Cleaning Booklet

MacDermid, Inc. (Chemicals), Waterbury, Conn., has just issued an interesting booklet (8 pages 5¼x7⅝-in. inside the covers) which reveals information about the company's several Metex cleaners, strippers and burnishing compounds—and particularly "Grade R," the new metal cleaner for industrial metals.

Piper to Sell Swoboda Electric Furnaces

H. O. Swoboda, Inc., 4301 Main St., Pittsburgh, Pa., announces the recent appointment of C. W. Piper, 2033 Maple Ave., Norwood, Ohio, as sales representative for the Southern Ohio and Eastern Indiana territory, covering "Falcon" continuous electric heat-treating furnaces, electric immersion heaters and industrial heating equipments for specialized applications. Mr. Piper has had considerable experience in the industrial electric heating and industrial control fields.

What's New « «

For Spraying Flock

A SERIES of direct exhaust type spray booths, designed especially for the peculiar requirements encountered in the application of flock is announced by The DeVilbiss Co., Toledo, Ohio. These new booths permit the concentration of spraying operations in one location, prevent material from scattering throughout finishing room, and reclaim all sprayed flock not applied to articles.

Booths range in sizes from 2 to 10-ft. front width. All are equipped with standard direct type exhaust fans. Removable cheesecloth screens at rear of booths collect the flock and prevent it from passing out the exhaust pipe.

Booths in sizes of 2, 3, 4, 5 and 6-ft. are leg type. They are made entirely of 24-gauge galvanized sheets formed into panels, bolted together and set on a framework of black angle iron. They are equipped with metal curtain on top and sides and are provided with the required number of sprinkler openings. A covered opening in the bottom of the booth allows for the easy removal of accumulated material.

At left, the screen is in place and the bottom opening is covered. At right, one section of the screen is removed and the bottom opening is uncovered.

Larger booths are of the floor type and may be obtained with a metal floor if desired. Standard panel construction in which 24-gauge galvanized sheets have been used. They are provided with curtain at top and the necessary number of sprinkler openings.

Because of the great variety of requirements among finishers who use flock, it is advisable that each booth installation be surveyed and engineered to the particular needs of the user. These booths, therefore, are built only to special order.

H. D. B. Production Spray Gun

NO. FIVE IS the identification of a new spray gun designed and developed by H. D. Binks of the H. D. B. Corp., 900 N. Spaulding Ave., Chicago, Ill. Its purpose is to meet any conditions in industrial finishing, such as spraying materials that have greater solid content—and doing the job more smoothly, more rapidly and with less wastage of material. The results of numerous tests in actual service by users, indicate that its performance is highly satisfactory.

Perhaps the most outstanding single feature is the new type nozzle head which operates on an entirely new principle, producing a highly atomized break-up of material, yet with actual forward speed of the spray reduced to such an extent that a very noticeable portion of the usual spray mist is eliminated—this for the reason that the material does not hit the surface at the usual high

speeds. Another merit claimed for the slower speed spray is that material which has already been applied, and which is still wet, is not rippled as formerly . . . no objectionable orange peel effects.

The new gun is unique in body design. Perfectly balanced, having all moving parts constructed in one line to eliminate off-side pulls, it will operate consistently over a long period of time without replacement of any of the parts. According to the manufacturer, it "handles easily . . . shows considerable material saving . . . eliminates most of the sanding expense because of the smooth finish it produces."

Paint Fluid Hose Resists Solvents

A NEW TYPE of paint fluid hose which successfully resists all commercial solvents and which, in actual service, has lasted 4 to 20 times longer than rubber compounded hose, has just been announced by the Electric Hose & Rubber Co., Wilmington, Delaware.

The tube of "Electric" (DB Type) paint fluid hose is made of a newly developed compound possessing all of the strength and flexibility of rubber, but being free of the usual tendency to soften, slough off, break apart or disintegrate when in contact with oils or solvents. As a result, this fluid hose eliminates the well-known fault found with rubber stocks which slough off and permit particles of

Construction features of the hose.

rubber to mix with the paint and spoil the finish.

Couplings will hold satisfactorily in this hose because the special composition tube stays in place and maintains a firm grip on the coupling at all times. The hose is of well-known braided and moulded construction. It is extremely light and flexible and its cover will resist rough wear. It is made in ¼, 5/16, ⅜, 7/16 and ½-in. inside diameter, and can be furnished in any length up to 500-ft.

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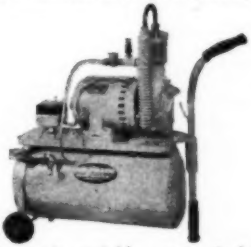
pressure of 50 to 70-lbs., with a free-air delivery of 3-cu.ft. per minute, which is sufficient to operate a pressure-feed type spray gun continuously. The outfit includes a 10x20-in. storage tank upon which is mounted the motor-driven compressor unit, as shown in the accompanying illustration.

Being portable, this outfit can be moved to wherever compressed air is needed—this feature often proving to



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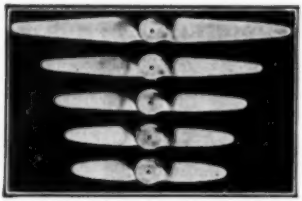

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actual treatment consists of dipping the metal parts to be treated into the Loxal solution. About 10-oz. of Loxal powder and 3-oz. of Loxal solvent per gallon of water are dissolved in an iron tank. The parts to be treated are immersed into this solution in perforated iron baskets, on racks or by conveyors or trays, and are held in this solution for a period of from one to five minutes and are then given a quick rinse in hot water, after which they are dried in the open air or by a warm air blast.

Little preparation is needed before treatment. Removing oil or grease and sometimes a brief pickling treatment, followed by rinsing in hot water, usually suffices.

The equipment required includes only a metal tank of requisite size, fitted with steam coils to heat the solution to 150°F.—with facilities for filling the tank with water and for handling the material to be treated.

When metals are coated with Loxal, such parts may be stored without danger of rusting, until the manufacturer finds it convenient to apply the finishing coat. The Loxal coating also acts as a bonding coat, presenting a uniform surface, free from blemishes, to which the finishing coat of paint, lacquer or enamel tenaciously adheres. Should any part of the base metal become exposed through a scratch or a break, this protective coating will inhibit the spread of rust.

Loxal is applicable to practically all types of iron and steel surfaces. The carbon content of the steel has no appreciable effect in retarding the formation of the protective coat, and excellent results have been obtained on steel objects which have been spot-welded or which carry an oxidized film on the metal surface. The same desirable coating can be formed on cadmium, zinc, and certain other non-ferrous metals.

Since no chemical incrustation forms on the heating coils, whether made of iron or brass, highest heating efficiency is maintained.

Loxal is a product of the Curtin-Howe Corp., 403 Lexington ave., New York, N. Y.

Wax-Polishing Fir Handles

We wish to apply a wax polish to some Douglas fir handles and, if possible, we want to do this while the handles are spinning between centers in machines. We find that an ordinary soft wax is unsuitable, as part of it soaks right into the wood, and part evaporates.

We wonder whether you have any information on file as to a material which could be applied quickly and which would dry fast enough so that the handles could be thrown into trucks immediately after the operation, without sticking to one another?—M. L. Co. (Handles, Dowels, Curtain Poles).

In regard to this question, will say that on small handles, such as we make, we tumble the wax on in barrels, using paraffin wax of a low-melting point. We presume the handles you refer to are long handles, and in putting on wax while they are revolving in a machine, we would expect that paraffin wax might be too hard—but concerns who make waxes would be in better position to advise you on this than we are.—McLain Wood Products Corp. (by F. H. McLain, Gen. Mgr.).

This fir lumber, I understand, is a soft open-grained porous wood, therefore I would suggest applying a sealer coat as the first operation. White shellac makes a satisfactory sealer. The shellac can be applied while the handles are spinning between centers in the lathe, or by the tumbling process. The latter procedure gives good results and is much cheaper from the standpoint of labor and volume production.

Questions « Answers

For applying shellac to the handles revolving in a lathe, I would suggest using a brush, the size depending on the length of the handles. Use a 4-lb. or 5-lb. cut of white shellac (that is, 4-lbs. or 5-lbs. of gum shellac to the gallon of alcohol) thinned 50% with denatured alcohol. Make two or three brush strokes the length of the handle, after which the shellaced handles will be dry enough to be kicked off into baskets . . . without sticking together. Do not load on a heavy coat as this may cause an uneven surface, and it will not dry rapidly.

This shellacing or application of a sealer coat necessitates an extra operation, but I see no other way of holding out the wax and preventing its penetration into the soft open-grained wood without first sealing the pores of the wood.

For waxing, use any good grade of heavy paste furniture or automobile wax which will dry fast enough over the shellac sealer to prevent sticking together, providing too heavy a coating is not applied.

By the tumbling process both operations (sealer coating and waxing) can be satisfactorily applied in the barrel. Proceed as follows:

Fill the barrel with handles to within 8-in. of the loading door. The barrel should revolve 28 to

32-r.p.m. Make about four applications of shellac; that is, pour in one pint of shellac for each application,* doing this at intervals of about 20 to 30 minutes apart, or until each application has tumbled dry. Allow the last application to rumble a little longer to smooth up the fibers of the wood which naturally rise to some extent due to the alcohol action. The shellaced handles should be allowed to air dry at least five hours; overnight would be better.

For the wax-polishing operation, put the handles in a tumbling barrel and add 10 or 12 walnut-size pieces of carnauba wax and several handfuls of clean soft scarp leather. Allow the handles to rumble until the necessary degree of polish is obtained. For volume production I would certainly recommend the tumbling process.

A satisfactory hard wax for polishing by the tumbling process can be made up as follows:

Carnauba wax	(pounds) 3
Beeswax (white refined)	1
Paraffin	6
Alcohol (denatured)	(pint) ½

After the waxes and paraffin are melted and thoroughly mixed together, add the alcohol before the mixture cools.—J. E. GREENE.

*This may be too much or too little, depending upon the size of the barrel and the number of turnings therein.

Coating Wood Slats

On page 4 of the June issue, one of your readers enquires about coating wood slats in 12-ft. lengths.

We have had considerable experience with the Venetian blind industry in the last few years and the larger firms find it more practical to use a roller coating machine in preference to spraying or the squeegee process. The squeegee process is not as rapid as the roller coating principle and where the latter is used, rubber rollers are possible (or where oil or semi-synthetic base materials are employed) but if lacquer or synthetic type lacquers are used, our observation has been that gelatin-base rollers are more practical.

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PULMOSAN RESPIRATORS

The machines now being used for coating wood slats are practically all custom built but in principle are quite similar. As the gears employed and rollers used can be obtained as standard from various sources, the possibility exists for your reader to possibly build his own machine at a comparatively nominal cost.

The table ordinarily adjoining a roller coating machine some times determines the length of slat possible to coat. In other words, one can place the slats at this feed table and the machine will accommodate all lengths whether one foot, ten feet, or fifteen feet.

The method of drying is usually by suspending the slats on portable drying racks on which wire nails are protruding to minimize contact marks, and the speed of production is dependent upon the nature of material used. One of our good customers finds it possible to recoat within one hour; another one allows four to five hours —this extremity being accounted for by the nature of the material used and the final finish demanded.—AULT & WIBORG CORP. (by A. E. WEIL).

Machine Tool Gray

EDITOR'S NOTE: The following correspondence between the Editor and the Lowe Bros. Co. (Paint and Varnish Makers), Dayton, Ohio, discloses information which will serve to answer several of the questions that come up in the industry about the color known as "Standard Machine Tool Gray." Our letter to the Lowe Bros. Co. follows:

"From time to time we receive requests for information about "Standard Machine Tool Gray" and we un-

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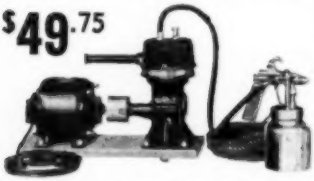

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derstand, from a letter written us by the National Machine Tool Builders' Association, that you are the color custodians of this particular color. In this connection, we are wondering to what extent the manufacturers of machine tools and manufacturers of machines for the various industries such as, for example, the woodworking industry and others where machines are used inside factories, are using this standard machine tool gray?

"We have heard that this was agreed upon as a satisfactory standard gray by the majority of manufacturers several years ago, but that now many of them have drifted away from it and have varied the shade to suit their own individual preferences or the preferences of the majority of their customers."—I. F. (by W. H. Rohr).

The reply from the Lowe Bros. Co. includes the following:

"Prior to the adoption of this standard color, there was quite a variation in the shades used by different machine tool manufacturers, although practically all of them were grays of one cast or another. Because of this variation in color, a manufacturer buying equipment for his machine shop found that practically none of his machines matched in shade. The large manufacturers such as Ford, Hudson Motor Car Co., Western Electric Co., Curtis Airplane, and many other companies adopted a shade of their own and insisted that all machines be painted this standard color. Their chief object was to have the various equipment in their machine shops all of one standard shade, which was impossible unless they adopted a standard shade of their own and purchased all equipment on that basis.

"In the absence of any agreement, each manufacturer was forced to supply these companies with machines painted in special colors, all of which increased their cost and, what was far more important, seriously delayed the shipment. The chief reason then for the adoption of a standard color was to get away from this problem of supplying different manufacturers with different shades to suit their own standards. After the adoption of the new standard gray, it was possible to adopt also a common practice of making a definite charge where a machine was furnished in a special color.

"Answering your question as to how general the standard color has been adopted, will say first that the Machine Tool Show given in Cleveland in October, 1929, showed only two instances of machine tools not painted in the standard color, although this color had only been adopted 60 days prior to the show.

The desire for a uniform color was so unanimous that we do not believe there are a half dozen machine tool companies in the country who did not change over to the new standard shade. In fact, we do not remember a single one which is not using the standard color although we, of course, do not supply all of the machine tool manufacturers . . .

"In addition to the adoption of this color by the Machine Tool Manufacturers, we find a tendency on the part of allied lines such as engines, motors and similar equipment to adopt this same Standard Machine Tool shade because their products are sold and used in the same shops as machine tools in many cases. We find even printing-press manufacturers who have adopted the standard shade, although in no way linked with the machine tool industry.

"In general, we might say that this uniform shade has met the almost unanimous wishes of the machine tool builders and there has been no tendency for them to deviate from the standard. We are attaching a color chip to show shade, these being made up as a convenience to machine tool manufacturers to show the standard color to their trade. It so happened that our company along with two other paint concerns was represented at the Color Standardization Committee meeting due, no doubt, to our activity in that field. The standard shade adopted was one of nine colors which we offered for their approval and we were therefore made the custodians of the standard color and as such, we supply both machine tool manufacturers and other paint manufacturers with standard wet samples on request of National Machine Tool Builders' Association office."—The Lowe Bros. Co.

Our comments upon the darkness of the gray sample submitted:

". . . Personally, I am somewhat surprised and perhaps a little disappointed to find that this Standard Machine Tool Gray, as indicated by your color chip or card, is so nearly black. A few years ago I had occasion to visit several woodworking factories where the latest machines were being installed, and at a time when gray was becoming so popular. I believe I am correct when I say that practically all of the new grays I saw were much lighter than is indicated by your sample. They looked very good, too, and I know it was my impression then that at last woodworking factories are getting machines of a color that is better for the workmen, and which helps to promote the good lighting that is characteristic of the latest type of buildings in the industry.

"Of course, this applied to wood-

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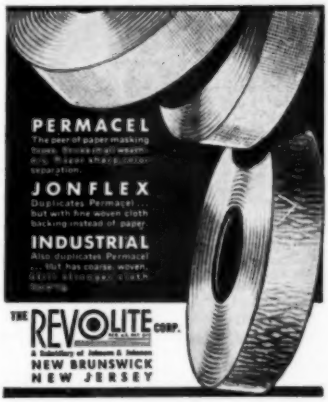
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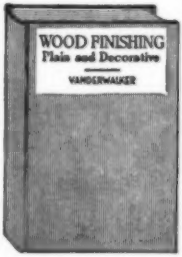

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working machines. Perhaps it is really desirable that machine tools should be darker in color because of the nature of the work and the amount of black grease and oil and grime that are present in metal working."—I. F. (by W. H. Rohr.)

The Lowe Bros. Co's. answer to the preceding comments:

We have your letter of June 27 raising the question as to whether there has not been a demand for a lighter shade for use on machines which would have better light reflection and diffusion. Once in a long while this question comes up, as for example, in connection with the Simonds saw plant down in the East, but these cases are very unusual.

"I had occasion to discuss this very matter with Mr. George Erwin, Sales Manager of Kearney & Trecker Corporation of Milwaukee, who was the Chairman of the Color Standardization Committee which adopted the present Standard Machine Tool Gray for the machine tool manufacturers. He states that it is exceedingly rare to get calls for a light shade on machine tools and, in his opinion, the trade is apparently perfectly satisfied with the present dark gray.

"We realize this may come up at some future time, but the main consideration on the part of the machine tool builders was to pick a color which would not show oil and grease readily, and the present shade seems to meet that condition very nicely."—The Lowe Bros. Co. (by C. L. Vandeman, Manager, Industrial Trade Sales).

Decorative Porcelain Enamel

Porcelain - enameled coffee - tables and cocktail-trays, designed by H. Edward Winter for Ferro Enamel Corporation of Cleveland, Ohio, have been selected for a traveling exhibit by the National Alliance of Art & Industry. Ferro Enamel Corporation entered a group of Mr. Winter's murals, tables, trays, etc., in the recent New York show of the Alliance. The company manufactures porcelain enamels for stoves, ranges, refrigerators, cooking-ware, etc. Feeling the material adapted to the more decorative uses, they commissioned Winter to execute murals, tables, trays and other art-objects. The new pieces are done in beautiful colors and in artistic designs originated by Mr. Winter.

The pieces have had good acceptance . . . they have the same texture and colorfulness as glass, as porcelain enamel is a form of glass, excepting that it is fused at high heat onto metal.

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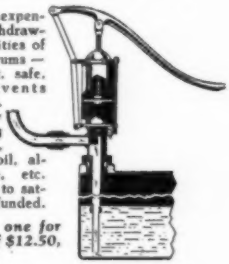

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EDITORIAL

Fashion Finishes and Novelty Finishes

In practically every progressive line of manufacturing it is the custom to show something new from time to time—new designs, new utility features, new materials in construction, new ornamentation, new colors or finishes and decorative effects. Every time a planned change (that doesn't represent a copy of something else) is made, the originator or sponsor of such change usually hopes he has hit upon something that will take well with the buyers, and perhaps set a new mode which will be flattered by more or less imitation on the part of others.

It is a fine thing that these changes are continually going on because out of some of them comes real and permanent improvement. Others are only passing flashes which burn themselves out in a short time.

The concern that brings out something really new or original in the way of a finish should feel a sense of responsibility and pride in its work, just as though it were actually stepping out in the spotlight and setting a new style. That new finish should be made just as good as possible with the materials, equipment and knowledge available at the time. It may strike the popular fancy and become a style leader—and if so, what a shameful discredit it would be to the manufacturer and to the finish itself if it were to prove unsatisfactory because of needless indifference, carelessness or cheapness—or because of some other preventable cause.

Permanence of color, beauty, smoothness and durability have much in their favor, and these merits are often responsible for the popularity of a finish, color or decorative effect — and for later revivals of that finish. Even if a new or novelty finish proves to be only "a flash in the pan," if it is of high quality it will stay popular longer and will give greater satisfaction while it is the vogue —and it will help maintain the good name of the manufacturer.

That old homely saying, "If a thing is worth doing, it is worth doing well," holds good here, too. Do not slight a finish just because you think its popularity may be

short lived. A good finish will win friends and even if it doesn't become a profitable number immediately, it may be revived later, either in its original or in a modified form—and next time it will probably have a greater demand for a longer period of time.

Paint, Varnish and Lacquer Sales Higher Than 1931 Peak

Paint, varnish and lacquer sales for May, 1934, as reported by 586 manufacturers, exceed 33 2/3 millions of dollars, which tops the month of May sales for 1931—the highest for any month since 1930. This data is based on the U. S. Department of Commerce Bureau of the Census report released July 2, 1934.

Past records show that sales in paint, varnish and lacquer products (industrial, trade and unclassified) reach the highest peak in May or June. In 1931 and 1932 the peak was reached in May, but in 1933 it was in June when total sales amounted to almost $28,000,000. The highest total sales for any month in 1932 was $24,981,441.

The sales curve for 1934, from the middle of February ($17,715,447) to the middle of May, closely follows the sharply ascending line drawn with a draftsman's 60°-30° triangle.

Conveyors for Production Finishing

Most of us are pretty well acquainted with the mechanical principles entering into the building and operating of a conveyor or conveyor system, because they are really quite simple where there are no complications. In some cases, conveyors or conveyor systems used in finishing departments are just about as simple as elsewhere. But there are many cases where this is by no means true. Where dipping, drying, baking, ordinary spray coating or even vaporizing is employed in connection with the performance of a conveyor, various complications arise that show different problems to be mastered, if a uniformly finished product, at a reduced handling cost, is to be obtained. It is not suprising, therefore, that some firms have decided to specialize on design and installation engineering for conveyor systems used in different kinds of finishing operations, and it is not at all strange that those who do so specialize become outstandingly proficient at the game.

Maintenance Cleaning of Painted Industrial Products

In addition to the tremendous amount of cleaning required to prepare metal and various other unfinished surfaces for finishing coats, there is also a large amount of maintenance cleaning which is rightfully a part of industry inasmuch as it is performed on factory-made products and in factory departments where finishing, refinishing and polishing operations are carried on. Cleaning solutions and mechanical cleaning equipment enter into the picture, therefore this field of activity should interest manufacturers of cleaners and mechanical cleaning apparatus.

Take for example fleets of automobiles, trucks and buses; also

street cars, railway cars and aircraft. To cite a specific incident, the foreman of a typical city bus and street car finishing, refinishing and cleaning department is confronted with several problems in connection with maintenance cleaning. He has tried various cleaning solutions and compounds, and he has also permitted a representative of a manufacturer of portable cleaning machines to make a demonstration.

One of his problems is: The only cleaning solution that he can find to do a satisfactory job on the white-painted fabric-covered roofs discolors the brightly painted sides of the cars wherever it drips or streams down over the sides from the roof. He is looking for an effective roof-cleaner that will not discolor the painted car sides—or a simple method of using the present cleaner in such a way as to avoid this discoloration.

Another problem is: The cleaning machine that was demonstrated for rapidly cleaning the sides of the car proved to be unsatisfactory in its present form and, according to the foreman, it was poorly demonstrated by the local representative. However, after watching this machine operate, the foreman expressed the opinion that a successful machine could be devised for the work, and he will welcome it because it will mean less labor and less time involved in cleaning each car and bus. He has in mind a device wherein liquid soap or cleaning solution can be fed, through operator control, to the rotary or reciprocating brush or pad, independently of a supply of water also under operator control. The machine's touch and action must be so gentle as to not dim the luster of the paint job.

The point is that the cleaning material and the cleaning machine that can be developed to do a satisfactory job for this foreman will also be applicable and in demand at numerous other shops where similar conditions and requirements prevail. It is an opportunity for some enterprising concern to enlarge upon its present sales.

Is Your Insurance Paid? Are Your Sprinklers OK?

The open season for industrial fires is at hand, judging from a number that have occurred recently—one of which the writer had an opportunity to witness. At this fire, the streams of water poured into the flames from several fire hose, had little effect. Only brick walls and heaps of tangled debris remained next day; but most unfortunate of all, the fire insurance had expired two weeks previously and hadn't been renewed. The building (old and unoccupied for several years) was sprinkler equipped but the water supply to the sprinkler system had been turned off. The building had recently been occupied by a different kind of business. Probably the new management, which was purchasing the building on the payment plan, thought they could get by for a while with the sprinkler system off and without renewing the fire insurance.

Sapolin Expands Industrial Finishes Division

Early in May, the Sapolin Co., Inc., 229 East 42nd St., New York, N. Y., appointed Augustus Wulfing, Thomas K. Ames and Bruno P. Stolz to their

staff. These well-known champions of high-quality industrial finishes were for many years connected with Emil Calman & Co., and will now devote their entire services to supplying Sapolin varnishes and enamels to the industrial field.

New industrial finishes will be made in the Sapolin Co's. Brooklyn plant, which is uptodate, with modern equipment and a trained technical staff to cooperate with Messrs. Wulfing, Ames and Stolz in rendering a service to users throughout the country.

Bakelite Synthetic Resins for Paints and Varnishes

A letter from Bakelite Corp., River Road, Bound Brook, N. J.:

"To prove how naturally Bakelite Synthetic Resins belong in high-quality paints and varnishes, and to indicate the extremely wide variety of Bakelite Resins which are available for the manufacture of specialized finishes, we have prepared the 24-page booklet, "Bakelite Synthetic Resins for Paints and Varnishes," which we are attaching to this letter. It is written in easy-flowing, non-technical style, and we hope you will find it of interest. Copies are available to your readers."

"Stonoleum"—Floor Material

A 4-page folder and a 2-page letter, sent out recently by the Continental Asbestos & Refining Co., 1 Madison Ave., New York, N. Y., describe and testify to the merits of Stonoleum for new floors, old floors, worn floors and for patching. According to information disclosed, Stonoleum is non-abrasive and will not crack, break, splinter or crumble; it is resilient, flexible, fire-resisting, dust-proof, skid-proof. It is easy to apply —no chopping or chipping of old concrete; no skilled labor required; no special tools needed.

Standard Enamel and Paint Corp. in Indianapolis

A recently organized corporation which is now engaged in the manufacture of paints, enamels, lacquers, stains and fillers, in a modern type building at 2158 N. Sherman Drive, Indianapolis, Ind., is the Standard Enamel & Paint Corporation. Officers of the company are:

A. W. Moodey.....President
Frank Metzger.....Vice Pres.
Robert Tatman.....Sec.-Treas.

Both Mr. Moodey and Mr. Metzger are well known in the industrial field, Mr. Moodey having been formerly connected with the Stickney Color Co., and Mr. Metzger with Finishing Products Co.—both of Indianapolis.

Classified Advertising

Advertisements under this heading 45 cents a line per insertion, minimum charge, $1.35. In estimating, calculate six words to one line, and add one additional line for heading. Use this department to obtain help, find positions, buy and sell equipment, dispose of manufacturing properties, etc.

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LACQUER FOREMAN WANTED

A rayon plant wishes applications for position of Lacquer Foreman experienced with Bakelite or resinous lacquers. Must be thoroughly acquainted with spraying, dipping and baking and with preparation of material to be lacquered, and have wide enough experience to develop lacquering process along different lines. Desirable that applicant also have knowledge of paint. State age, qualifications and experience. Address IF-524, care Industrial Finishing.

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. . . planning expansion, and have territories open for experienced Industrial Salesmen.

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HERE is the first authoritative handbook of its kind, containing much information that has never before been published. You will find between its covers facts, processes, and formulae that have been considered secret by many japanners.

The author has actually been doing this work for others for many years and he knows whereof he speaks. No one has ever gone into the subject of metal finishing more deeply than he nor has the subject ever been explained so clearly and effectively. This book was eight years in preparation.

Color plates and a multitude of tables and illustrations make the text even more clear and understandable. The volume is bound in harmony with its companions of the Practical Finishing Series and makes a rich, attractive appearance . . . 22 chapters.

Price $3.50 . . . . . *money refunded if book is not satisfactory.*

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Indianapolis, Indiana

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